FMRFamide-related peptides in insects, with emphasis on the myosuppressins

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In insects, a vast array of FMRFamide-related peptides (FaRPs) have been isolated and shown to be distributed extensively through the nervous system, both centrally and peripherally. In the periphery, FaRPs have a variety of modulatory actions upon contraction of skeletal, heart, and visceral muscle. A subfamily of decapeptide FaRPs, also known as myosuppressins, with the sequence XDVXHXFLRFamide has been found in several insect species and shown to inhibit spontaneous contractions of visceral muscles.

In the oviduct of *Locusta migratoria* one of these myosuppressins, PDVDHVFLRFamide, acts as a neuromodulator, inhibiting both spontaneous and induced muscle contraction. This appears to be a true physiological role for PDVDHVFLRFamide because a peptide which comigrates with PDVDHVFLRFamide is present within the oviducts, FMRFamide-like immunoreactivity has been localized to the electron-dense round granules contained in nerve endings of locust oviduct, and two receptors for PDVDHVFLRFamide, a high-affinity and a low-affinity receptor, have been identified in the oviduct muscle membrane.

More recently, we have detected the presence of an active peptide similar to another member of the sub-family of myosuppressins, leucomyosuppressin (LMS), in the brain of the cockroach *Diploptera punctata*. We have isolated a cDNA encoding the precursor for this peptide from cDNA libraries representing *D. punctata* brain RNA. Proteolytic cleavage of the predicted precursor and modification of the NH_2 and COOH-terminal amino acids results in a peptide identical to LMS (pQDVDHVFLRFamide). Southern blot analysis indicates that the gene is present in the *D. punctata* genome in a single copy. Study of the expression of the *Diploptera* LMS gene in the brain, using *in situ* hybridization indicates that expression occurs primarily in the pars intercerebralis of the protocerebrum. Elsewhere, expression occurs in the suboesophageal ganglion and cells of the mid-gut.

These results emphasise the critical role FaRPs must play in both central and peripheral forms of coordination.

Source: https://www.industrydocuments.ucsf.edu/docs/rycb0000